



The New Millennium Program: Validating Advanced Technologies for Future Space Missions

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Topics

- Program Objective
- Program Focus
- NMP Flight Team Partners and IPDT Members
- Microelectronics IPDT
- NMP Missions
 - Mission objectives
 - Technologies validated
- Summary

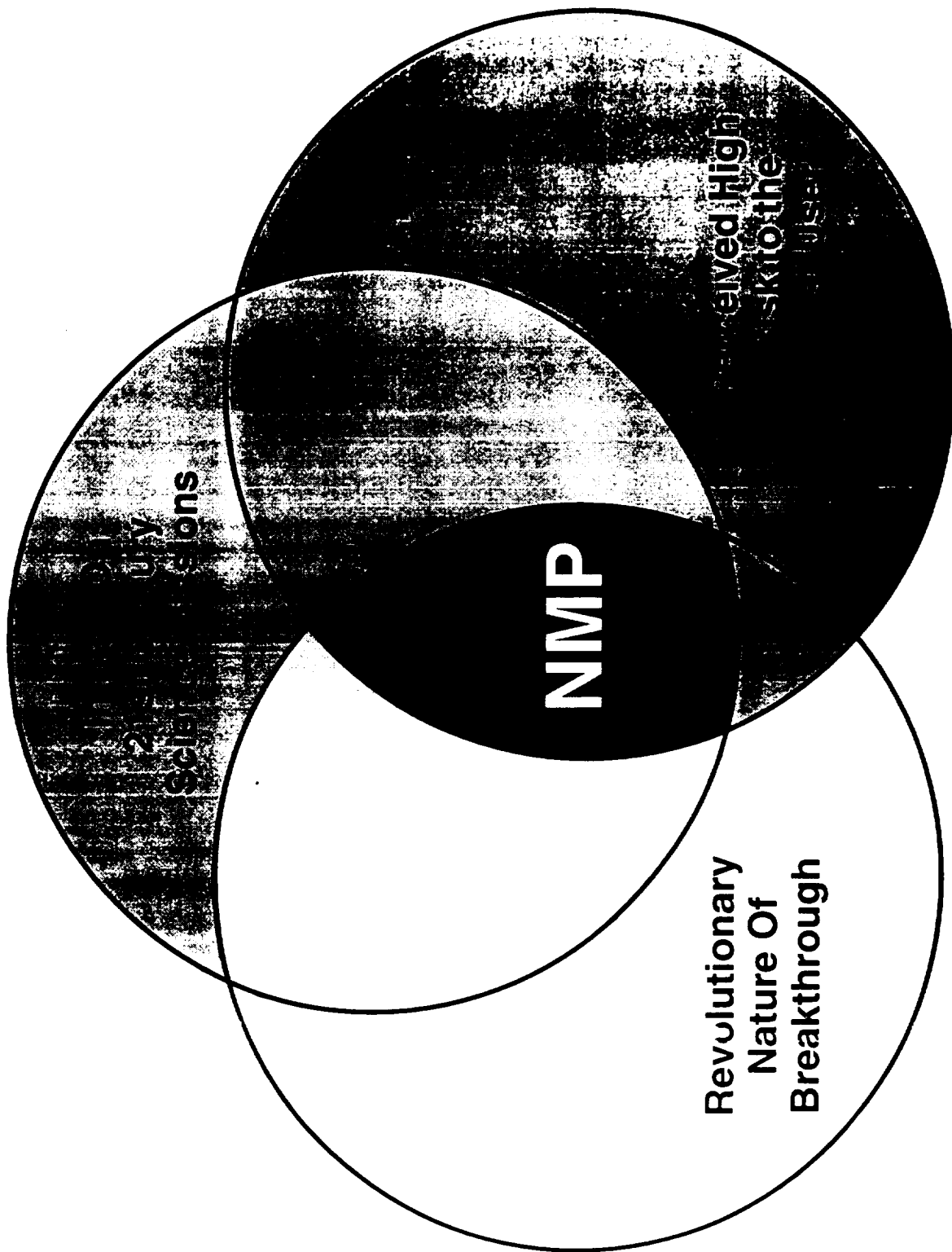


NMP Program Objective

- Conduct space flight validation of breakthrough technologies which will significantly benefit future Space Science and Earth Science missions
 - Breakthrough technologies focused on:
 - * Enabling new capabilities to fulfill the Science Enterprises' needs
 - * Reducing costs of future missions
 - Flight validation to mitigate risks to first users and enable rapid infusion into future missions

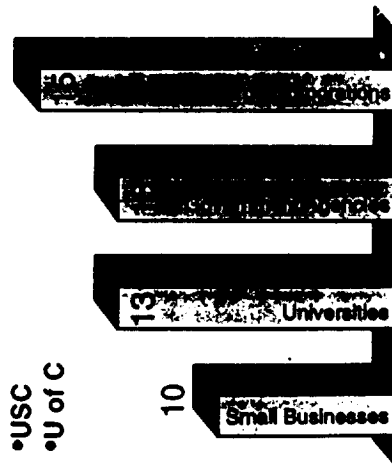
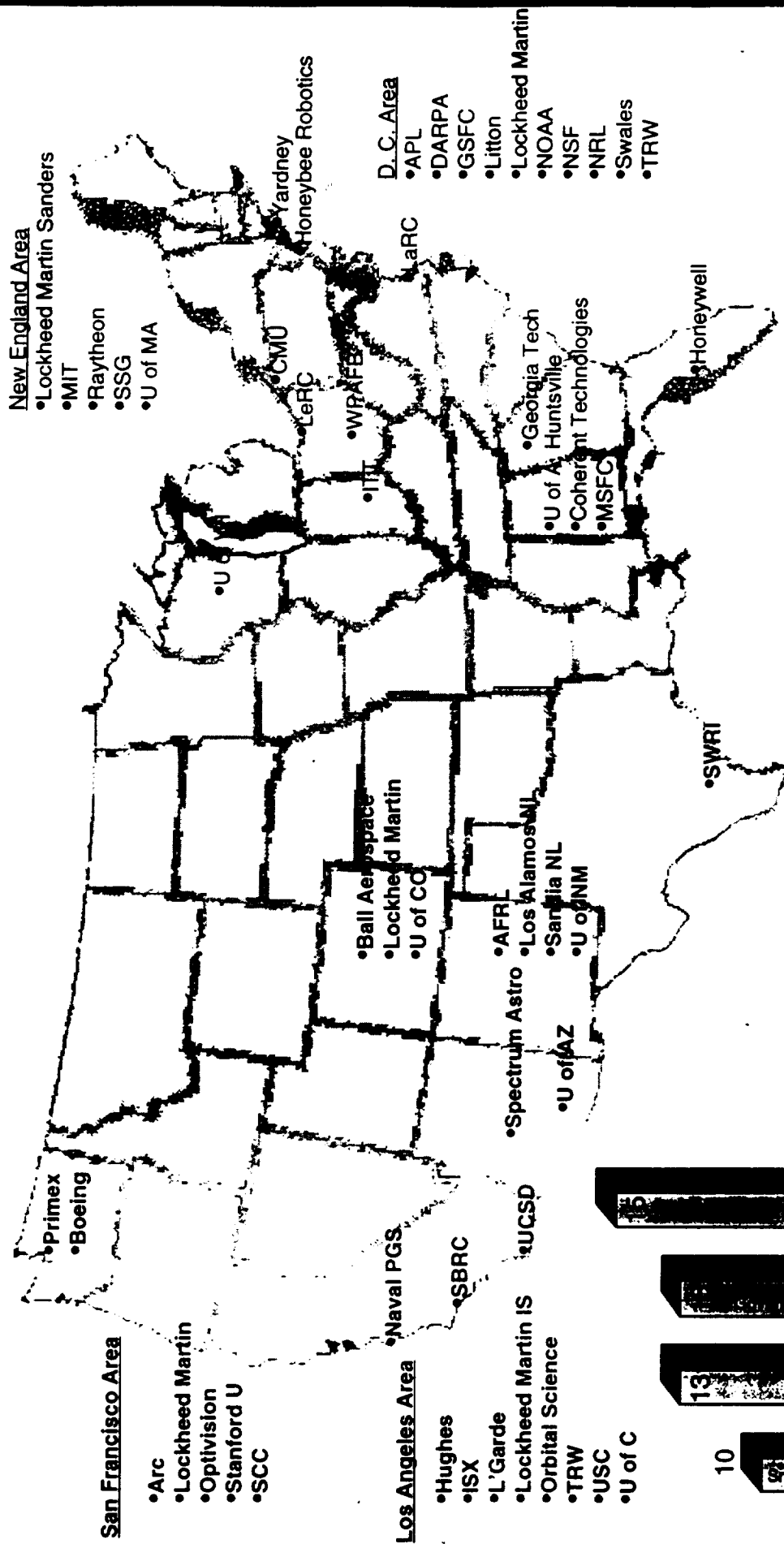


Program Focus





NMP Flight Team Partners and IPDT Members



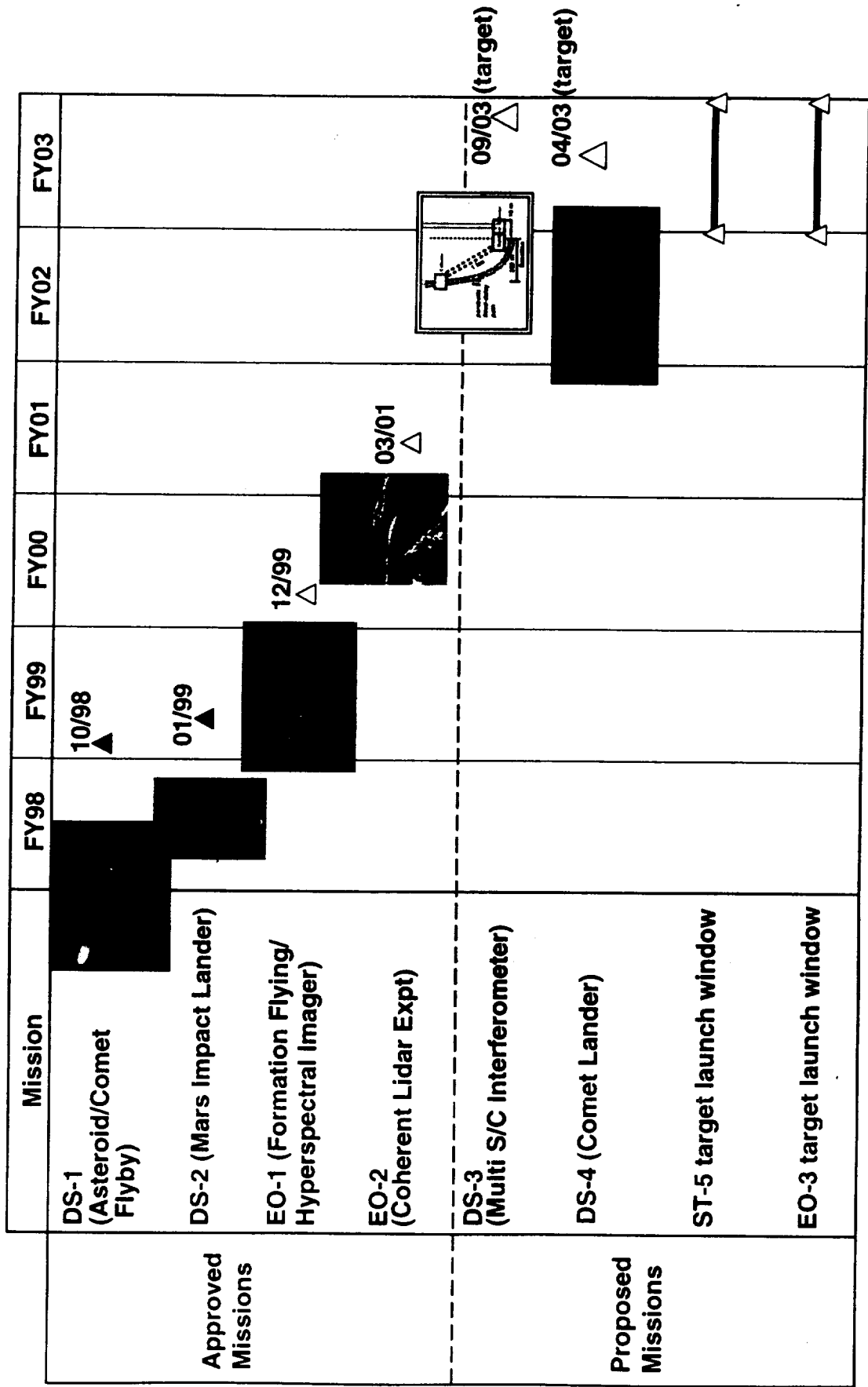


IPDT's Represent Broad Spectrum of Government Agencies, Universities and Industry

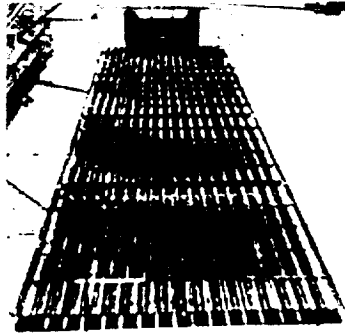
	Member Organizations
Microelectronics	USAF Research Lab, Boeing, Georgia Tech, GSFC ¹ , Hughes, Honeywell, Irvine Sensors, JPL ² , APL ³ , LeRC ⁴ , Lockheed-Martin, MIT/LL ⁵ , Optivision, Sandia National Lab, Space Computer Corp., Space Electronics Inc., TRW, UC/San Diego, Univ. of New Mexico, USC
Telecommunications	Boeing, GSFC, JPL, APL, Lockheed-Martin, Raytheon
Multifunctional Structures and Modular Systems	GSFC, Honeybee Robotics, JPL, LaRC ⁶ , L'Garde, MIT, ARC ⁷ , NOAA ⁸ , Primex, SGG, Univ. of Arizona, Univ. of Colorado, USAF Research Labs, Yardney, NRL ⁹
In-Situ Instrument and Micro Electro-mechanical Systems	DARPA, USAF Research Labs, Ball Aerospace, JPL, APL, LANL ¹⁰ , NSF, U.S. Navy Postgraduate School, Sandia National Lab, Southwest Research Institute, Stanford Univ., Univ. of So. Calif./ISI
Autonomy	ARC, Carnegie-Mellon Univ., GSFC, ISX Corp., APL, JPL, Lockheed-Martin, Stanford Univ., TRW, USAF Research Lab.
Instrument Technologies and Architecture	Ball Aerospace, GSFC, ITT Aerospace, JPL, APL, Lockheed-Martin, MSFC ¹¹ , MIT/LL, LaRC, NRL, NOAA, Orbital Sciences Corp., Raytheon, SGG Corp., TRW, Univ. of Wisconsin
¹ NASA Goddard Space Flight Center ² Jet Propulsion Laboratory ³ Johns Hopkins Applied Physics Lab ⁴ NASA Lewis Research Center	⁵ MIT/Lincoln Laboratory ⁶ NASA Langley Research Center ⁷ NASA Ames Research Center ⁸ National Oceanic and Atmospheric Administration ⁹ Naval Research Laboratory ¹⁰ Los Alamos National Laboratory ¹¹ NASA Marshall Space Flight Center



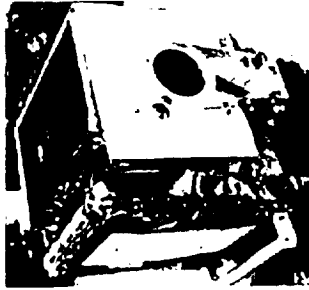
NMP Mission Launch Schedule



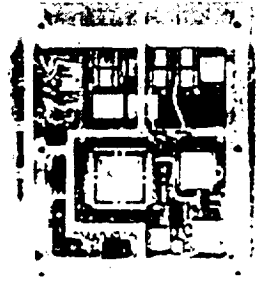
Representative Technologies Validated on DS-1 (Cont'd)



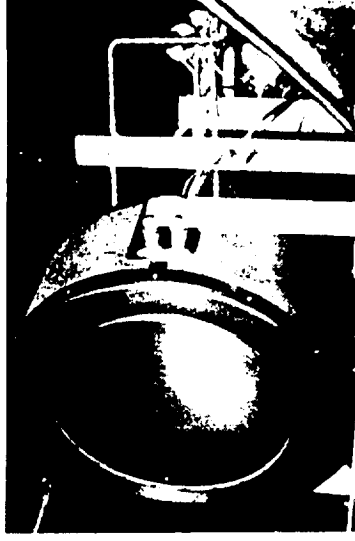
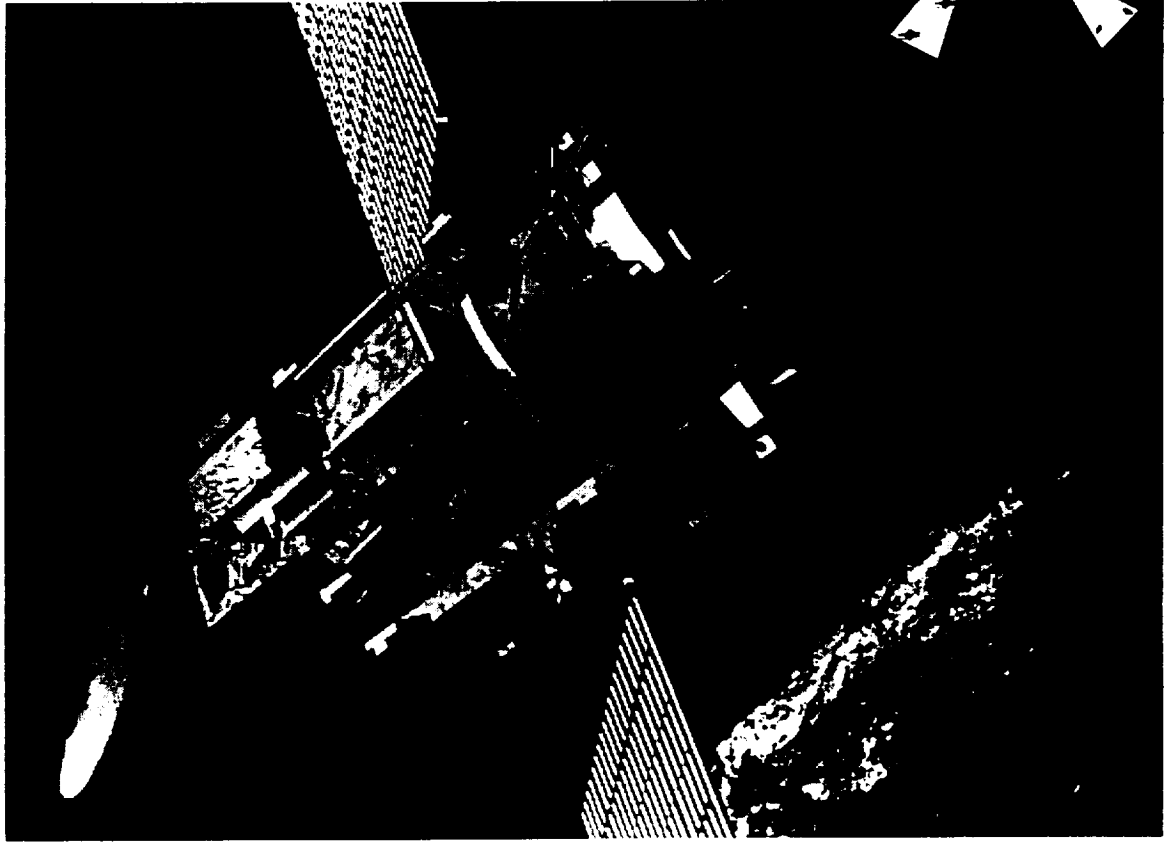
Advanced Solar
Concentrator Array



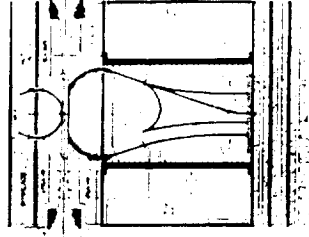
Miniature Integrated
Camera Spectrometer



Small Deep
Space Transponder



NSTAR Ion Propulsion System



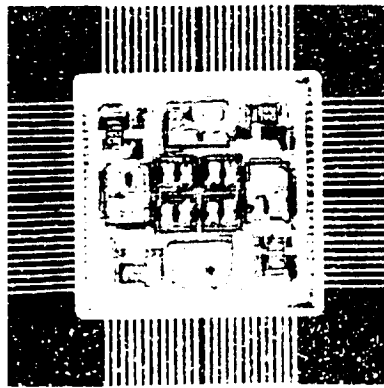
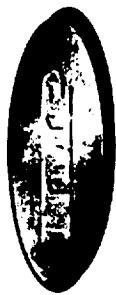
Plasma Experiment for
Planetary Exploration



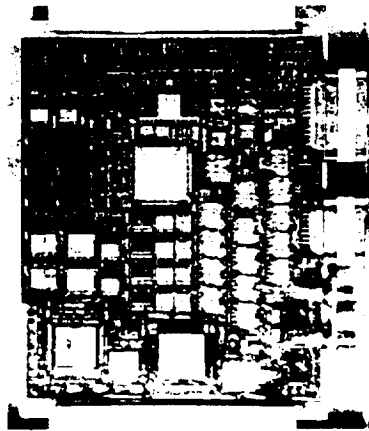
Autonomous Onboard
Optical Navigation



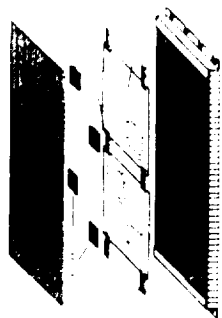
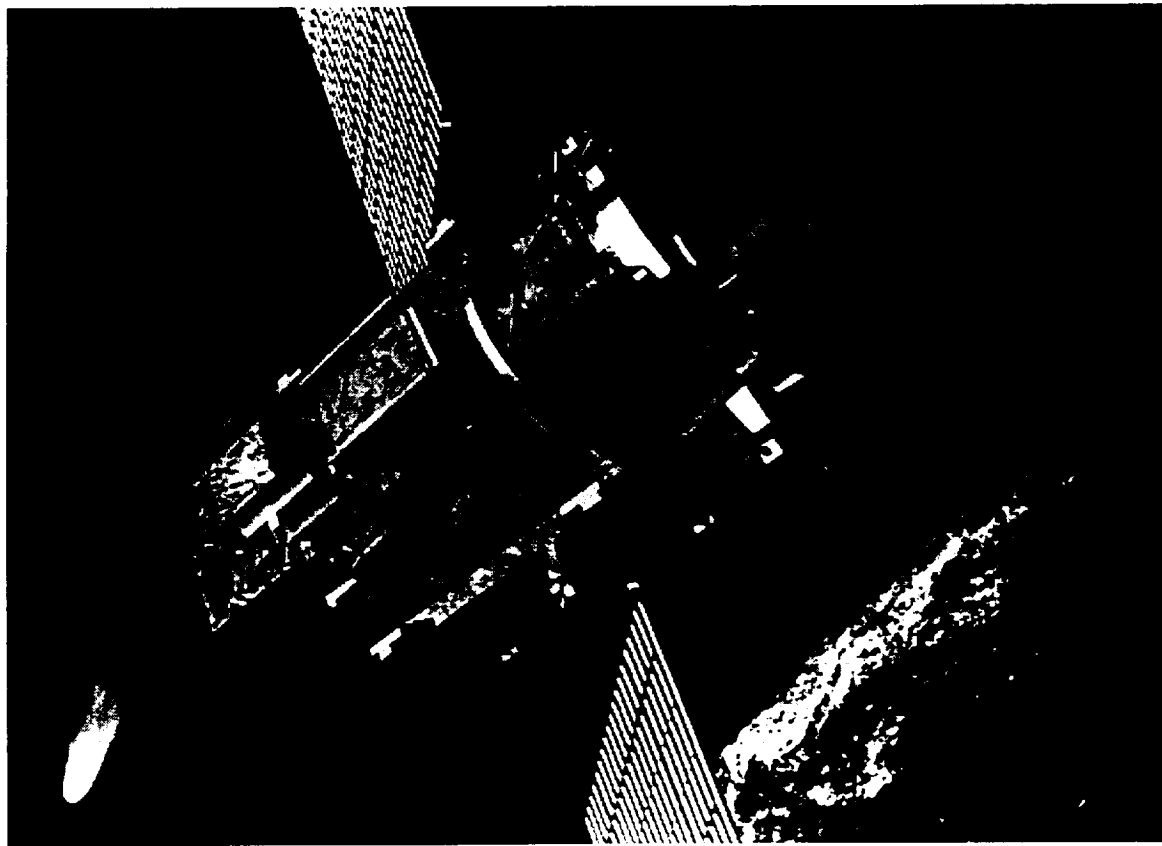
Representative Technologies Validated on DS-1



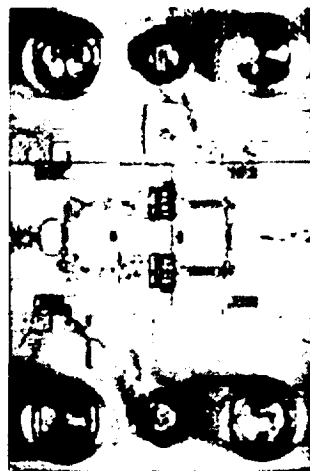
Power Activation and
Switching Module



Low-Power Electronics
Experiment



Multifunctional
Structures



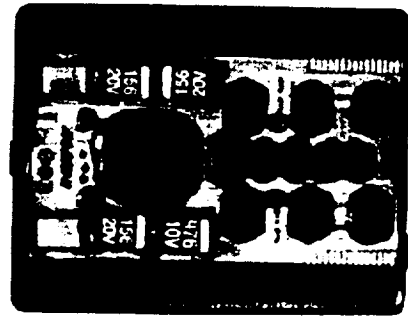
Ka-Band Solid State
Power Amplifier



Technologies to be Validated on DS-2



Advanced
Microcontroller



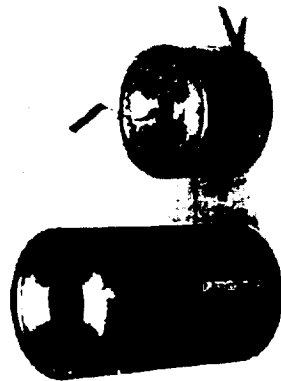
Power
Microelectronics Unit



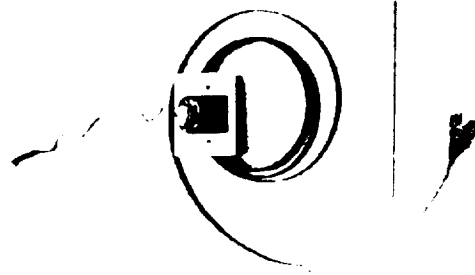
Evolved Water
Experiment / Soil
Thermal Conductivity
Experiment



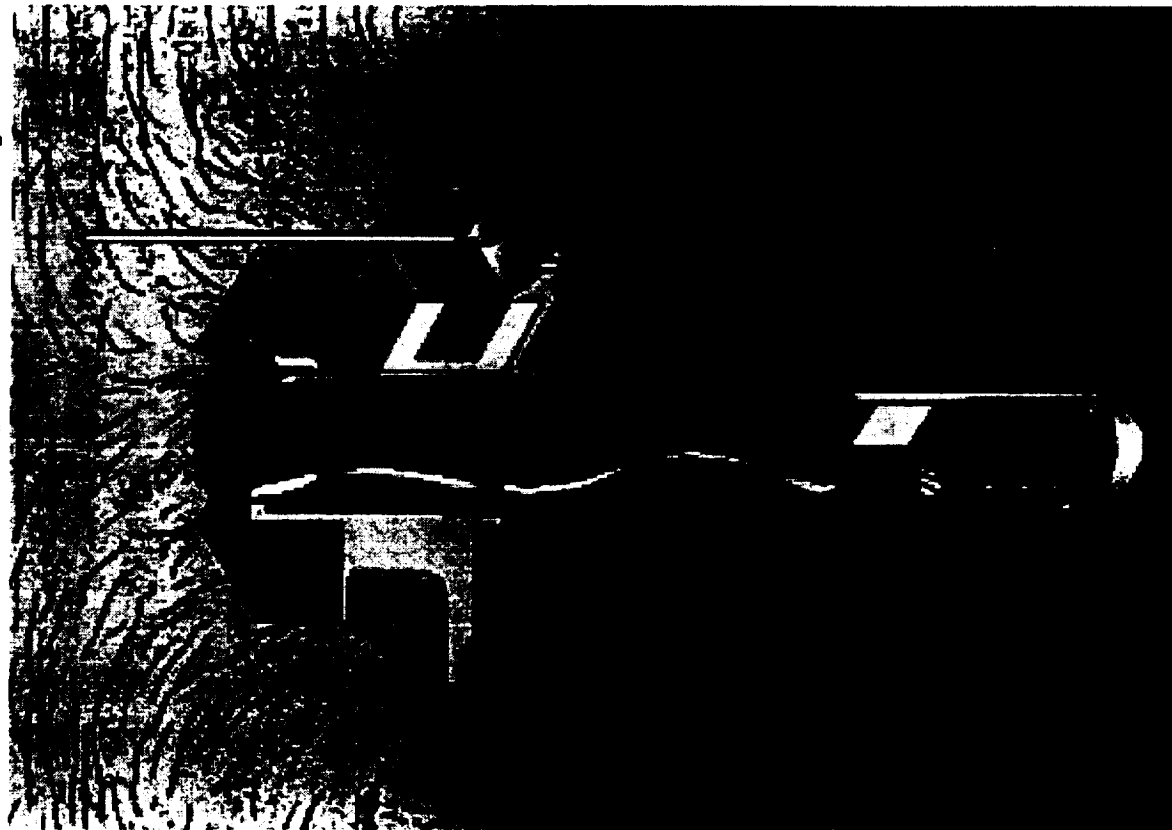
Technologies to be Validated on DS-2 (Cont'd)



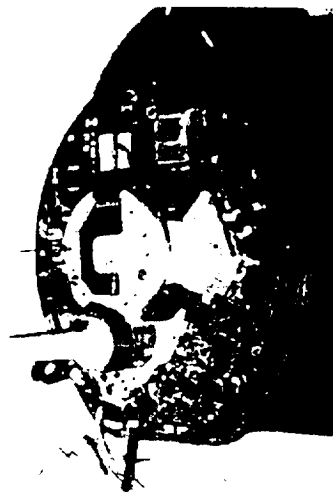
Lithium-Thionyl Chloride
Primary Battery



Flexible Cable
Interconnect



Aeroshell/Entry System



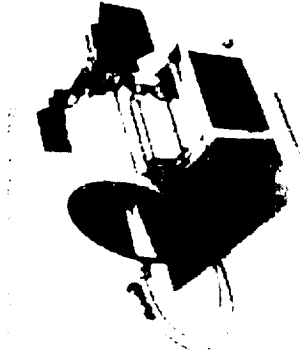
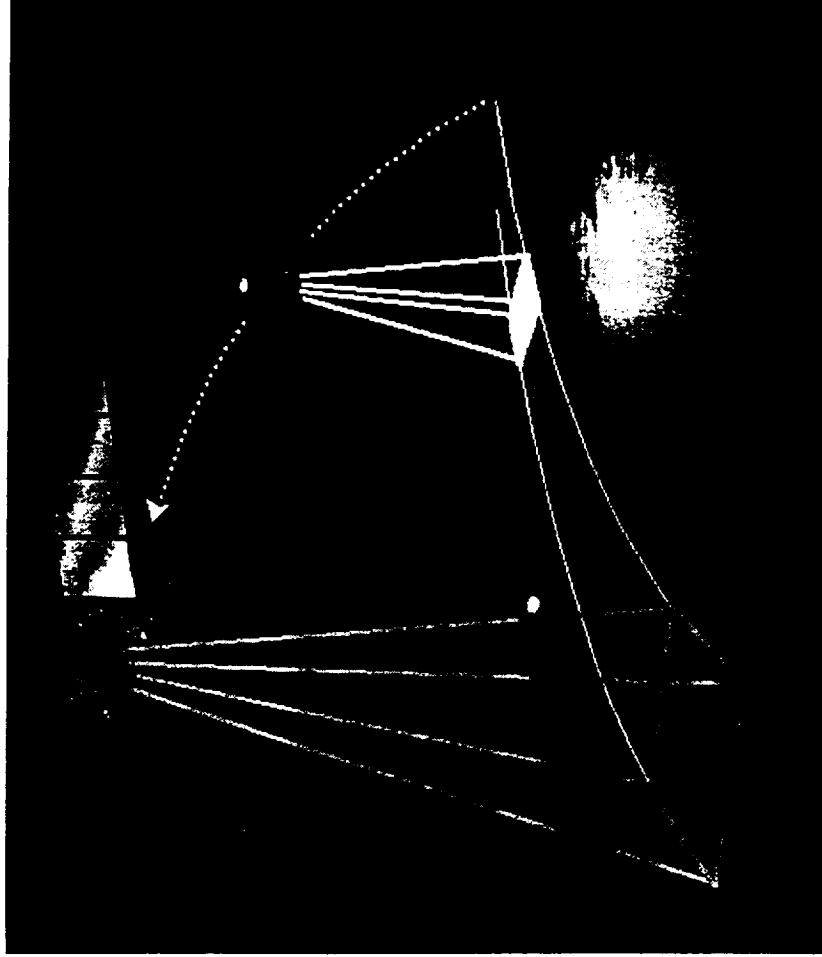
Compact Telecom System



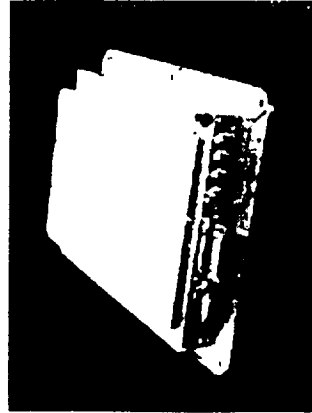
Technologies to be Validated on EO-1



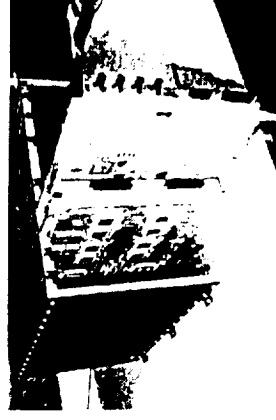
Carbon-Carbon
Radiator



Pulsed Plasma
Thruster



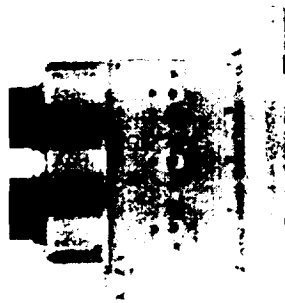
X-Band Phased Array
Antenna



Wideband Advanced
Recorder Processor



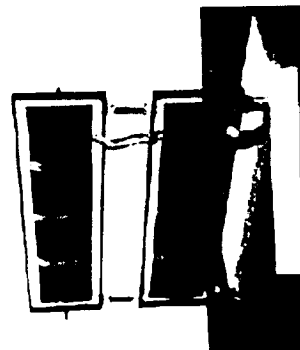
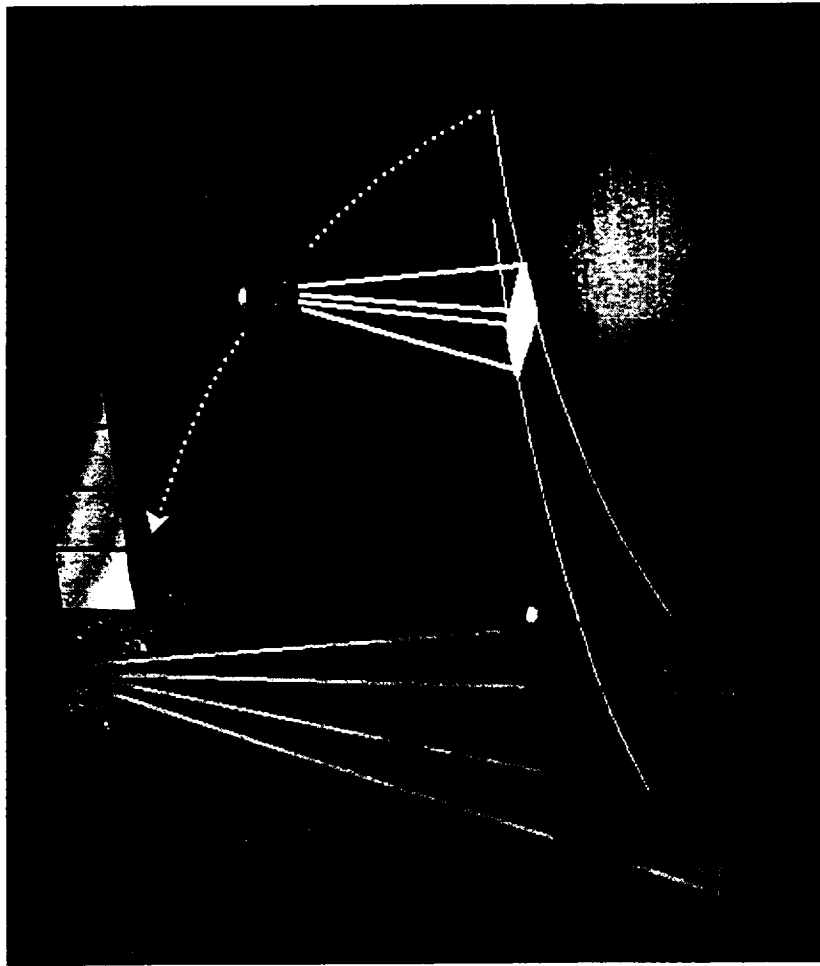
Technologies to be Validated on EO-1 (Cont'd)



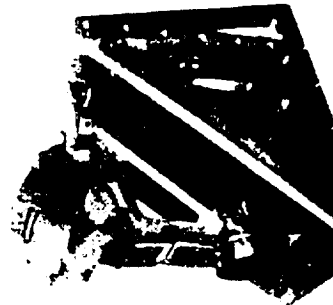
Atmospheric
Corrector



Advanced Land
Imager



Lightweight Flexible
Solar Array



Hyperion Instrument

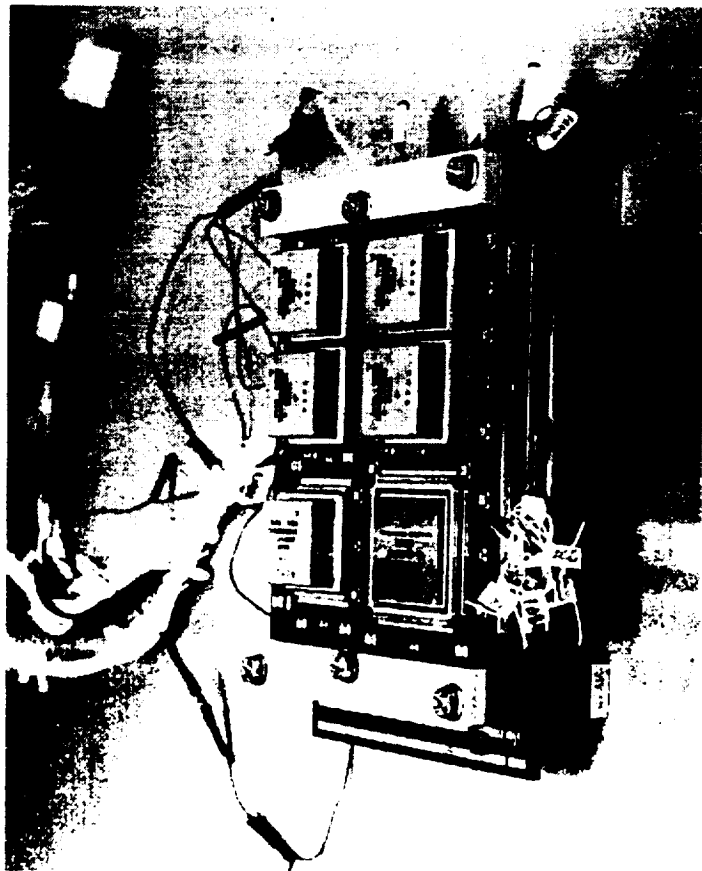
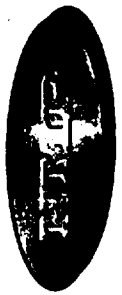


Technologies to be Validated on EO-1 (Cont'd)

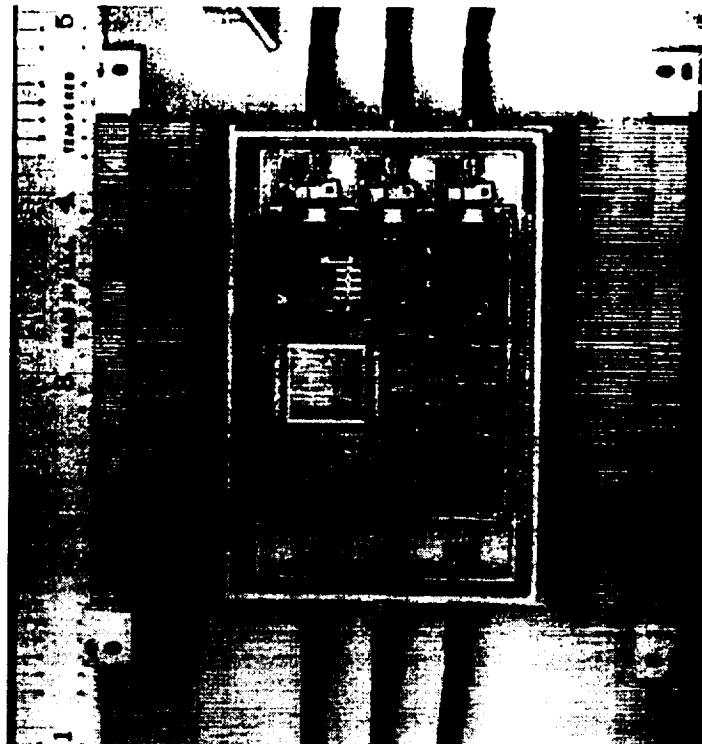




Other NMP Microelectronics Technologies



3D Flight Computer



Fiber-Optic Data Bus



Summary



- DS-1 launched 24 October 1998
 - Low Power Electronics Experiment operational/data analysis underway
 - Power Activation and Switching Module operational/data analysis underway
 - Multi-Functional Structures operational/performance parameters verified
 - All other technologies operational/performance analysis in progress
- DS-2 launched 3 January 1999
 - Expected to impact near Mars southern polar region on 3 December 1999
- EO-1 on schedule for launch in December 1999

**More details on microelectronics technologies
in this Session and in Session 8A**